

I. REMARKS

The final Office Action dated November 16, 2007, has been received and carefully noted. The amendments made herein and the following remarks are submitted as a full and complete response thereto.

Claims 1-5 are pending in this application.

Claims 1-5 are rejected under 35 U.S.C. § 103(a) over Deibert et al. (U.S. Patent No. 3,442,715) in view of Joshi et al. (U.S. Patent No. 5,454,922). Applicants traverse the rejection.

Claim 1 of the presently claimed invention is directed to a "paste composition for making electrodes of fuel cells, comprising 1 to 20 weight % of a carbon black supporting a hydrogen reduction catalyst, 1 to 30 weight % of an electrolyte, 1 to 50 weight % of an organic solvent with a boiling point of 100 to 200°C, and 30 to 80 weight % of a water-soluble organic solvent with a boiling point of less than 100°C" (emphasis added). Claims 2-5 depend from independent claim 1.

Applicants submit that Deibert et al. does not teach or suggest the presently claimed invention. Applicants submit that Deibert fails to teach or suggest a paste composition for making electrodes which comprises each component in the amount specifically claimed in independent claim 1 and dependent claims 2 to 5.

For example, Applicants submit that Deibert et al. does not teach or suggest a paste composition for making electrodes which comprises both "an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C" (claim 1) (emphasis added). Applicants assert that although Deibert et al. discloses a diffusion membrane electrode in which "[m]ixtures of organic

liquids” may be employed (Deibert et al., col. 4, lines 53-54), Deibert et al. does not unambiguously and specifically teach or suggest that the mixture should have both “an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C” (claim 1). For instance, in Examples 2, 3, and 4 of Deibert et al., the disclosed mixture is a composition having two solvents, but both solvents have a boiling point less than 100°C (isopropanol, which has a boiling point of 82°C, and benzene which has a boiling point of 80°C).

Applicants submit that the presently claimed invention, which comprises a mixture of “an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C” demonstrates unexpected results. For example, the paste composition of the presently claimed invention unexpectedly is “excellent in storage stability, [and] can give electrodes that have a sufficient pore volume for high generating performance” (specification, page 2, lines 3-5) (emphasis added). Further, Applicants submit that the presently claimed composition “comprises organic solvents of a specific boiling point... [which] make it possible for the solvent of the paste composition to evaporate at a controlled rate under drying conditions in the electrode production” (specification, page 2, lines 6-9) (emphasis added). Applicants submit that Deibert et al. does not disclose or suggest the unexpected and remarkable effects of having a paste composition for making electrodes which comprises both an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C.

Further, Applicants submit that “electrode reactivity will be lowered” or the “paste composition will be so viscous that the application produces irregular surfaces” if the amount of carbon black falls below or above the claimed ranged, respectively.

(see specification, page 11, lines 13-17). In addition, if the content of electrolyte is less than or above the claimed range, then, respectively, “lowered proton conductivity” occurs or “pore volume in the electrode will decrease” (see specification, page 11, lines 18-23).

Further, Applicants submit that when the “organic solvent with a boiling point of 100 to 200°C is used in amounts within the aforesaid [claimed] range, the resultant electrode can have an increased pore volume” (specification, page 11, line 24 to page 12, line 2) (emphasis added). Additionally, when the “water-soluble organic solvent with a boiling point of less than 100°C is used in amounts within the aforesaid [claimed] range, excellent coating properties can be obtained in the production of electrodes” (specification, page 12, lines 3-6) (emphasis added).

Applicants respectfully disagree with the Examiner’s assertion that “it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed value through process optimization.” Rather, Applicants submit that Deibert et al. does not provide any teaching or suggestion that a paste composition having the claimed components (hydrogen reduction catalyst, electrolyte, an organic solvent with a boiling point of 100 to 200°C, and a water-soluble organic solvent with a boiling point of less than 100°C) in the claimed ranges provide the aforementioned beneficial results.

Applicants note the general “rule that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art” (In re Boesch, 617 F.2d 272, 273 (C.C.P.A. 1980)). However, Applicants submit that based on the teachings of Deibert et al., the presently claimed invention is not within the skill of the art, because Deibert et al. provides no teaching or guidance of which variables

or components are “result effective.” In other words, Applicants submit that one of ordinary skill in the art would not be motivated to “optimize” the composition disclosed in Deibert et al., because Deibert et al. does not teach or suggest which components or variables of the composition are important for obtaining improved properties and beneficial results. In particular, Applicants submit that Deibert et al. does not disclose that the presence of the particular combination of an organic solvent with a boiling point of 100 to 200°C, and a water-soluble organic solvent with a boiling point of less than 100°C provides a paste composition with the beneficial results.

As such, Applicants submit that Deibert et al. does not teach or suggest the presently claimed invention.

Further, Applicants submit that Joshi et al. fails to satisfy the deficiencies of Deibert et al. Applicants submit that Joshi et al. merely generally discloses “methods for applying thin film catalytic electrodes to cationic membranes,” and in particular discloses that “[i]n each case, a mixture of Pt and C are utilized as the catalyst and electronic conductors while solubilized Nafion... is used as the binder and ionic conductor for the electrodes” (Joshi et al., col. 2, lines 13-18) (emphasis added). Applicants submit that Joshi does not disclose a “paste composition” (claim 1), as it merely discloses a “mixture.”

Further, Applicants submit that Joshi et al., like Deibert et al., fails to teach or suggest a paste composition having particular components in the amounts specifically claimed, or the resulting unexpected benefits. Specifically, Applicants submit that Joshi et al. fails to teach or suggest a paste composition for making electrodes which comprises both “an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C” (claim 1). Joshi et al.

also fails to teach or suggest which components or variables are “result effective.”

As such, Applicants submit that Deibert et al. and Joshi et al. fail to teach or suggest all of the elements of the presently claimed invention, as set forth in independent claim 1 and dependent claims 2-5. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-5 under 35 U.S.C. § 103(a) over Deibert et al. in view of Joshi et al.

II. CONCLUSION

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event this response is not timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension, along with any other additional fees which may be required with respect to this response, may be charged to Deposit Account No. 01-2300, referencing Attorney Docket No. 026035-00009.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Y. Kim', written over a horizontal line.

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